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The Production and Use of Evidence in Health Care Service Innovation: A Qualitative Study

Konstantina Vasileiou[1], Julie Barnett[1], and Terry Young[1]

Abstract

The focus of this article is on a range of concepts of evidence employed by health care innovators in pursuing service innovations and in demonstrating their success. In-depth, semi-structured interviews were conducted with 18 key informants in the United Kingdom who had won Health Service Journal awards for successfully implementing 15 service innovations. Four concepts of evidence were identified: (a) evidence of effectiveness—both direct and indirect, (b) evidence of efficiency, (c) evidence of innovation acceptance, and (d) evidence of relevance. The results suggest that the innovators articulated evidential concepts from the main approaches prevailing in the British National Health Service, namely clinical trials and improvement cycles. Most aspired to "better" evidence than they were able to obtain, while the approach to evidence gathering was very pragmatic and was more aligned with the improvement-cycle framework.

[1] Brunel University, Uxbridge, London, United Kingdom

Corresponding Author:
Konstantina Vasileiou, Brunel University, Kingston Lane, Uxbridge, London UB8 3PH, United Kingdom.
Email: Konstantina.Vasileiou2@brunel.ac.uk

Developing supporting mechanisms for assisting innovation evaluation is an important challenge if service innovation is to be routinely attempted and achieved in health care.

Keywords
evidential concepts, evaluation, service innovation, quality improvement, qualitative research

The reputation of health services in adopting new technology and in introducing sustainable change is poor (Robert, Greenhalgh, MacFarlane, & Peacock, 2009). Sometimes this is expressed as inertia (Coiera, 2011) where efforts to alter one parameter produce a response to restore the status quo, while others highlight lack of investment (Wanless, 2004). In this article, we examine the role of evidence in establishing the utility of health care service innovations.

An evidence base does not always guarantee adoption. Sheldon et al. (2004) explored the uptake of National Institute for Health and Clinical Excellence guidance and reported a nuanced response by physicians relating to clarity and funding as well as to the profession's own views of evidence. Evidence can often be contested (Fitzgerald, Ferlie, & Hawkins, 2003) and Jones, Johanson, Baldwin, Lilford, and Jones (1998) documented how physicians may be swayed by new evidence or adopt a skeptical stance to it. For example, compared to hospital physicians, primary care practitioners may be skeptical of evidence deriving from patient populations beyond those they routinely encounter and they consider that it is the wide replication of an effect that will turn it into "evidence" for integration into practice (Beaulieu et al., 2008).

Nonetheless, the application of trial-based evidence in clinical decision making is now well established. Gabbay and le May (2004) explored what evidence physicians and nurses in general practice actually used, in a context where there is little time to address the primary evidence base (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). The emerging picture was of a range of shortcuts which relied on professional and other interpersonal networks, along with "anecdotes with a purpose" as a way in which staff might learn from each other. Similarly, Higgins et al. (2011) showed that while health care practitioners valued scientific evidence, in practice they relied heavily on experience and tacit knowledge. Moreover, physicians contextualize evidence within the delivery environment, adjusting it to

patients' needs and profiles (Putnam, Twohig, Burge, Jackson, & Cox, 2002). Some consider that building a patient–doctor relationship and accommodating patients' attitudes may obstruct the appeal to evidence (Freeman & Sweeney, 2001).

Professionals' educational socialization also shapes views of evidence. Physicians, for instance, tend to favor a hierarchical view of evidence with randomized control trials (RCTs) as the "gold standard" while others, coming primarily from allied medical professions, do not always endorse this view, acknowledging the value of alternative research designs (Stewart, 2001). These findings suggest that views regarding what constitutes evidence are malleable, shaped by users' personal and professional values and their context.

Frameworks of Evidence in Care Delivery

Two frameworks of evidence dominate health care. The first was ushered in with the advent of the RCT (Doll, 1998) and the formal development of practice and infrastructure for evidence production following Cochrane's seminal work (Cochrane, 1972). Evidence-based medicine (Sackett et al., 1996) identifies RCTs as the "gold standard," although well-executed non-RCTs can also produce valid results (see Gugiu & Gugiu, 2010). Trials are generally interpreted using statistical models where the resolving power is a key indicator of the quality of the finding.

On the other hand, the focus on evidence in the delivery of care is more recent, traced to the Institute of Health Improvement and champions such as Don Berwick (Berwick, 1998). The Plan Do Study Act (PDSA) cycle (NHS Institute for Innovation and Improvement, 2011) has embedded (Benning et al., 2011; Young & McClean, 2008) as an operational standard for improvement in the British National Health Service (NHS), and although the operational industrial methods from which PDSA derives—Lean Thinking, Theory of Constraints, Six Sigma, and so on (Young et al., 2004)—are highly numerate in their treatment of evidence, the approach recommended for health care is more relaxed (NHS Institute for Innovation and Improvement, 2011).

These frameworks of evidence represent the terrain within which health care personnel are likely to conceptualize evidence. In this article, we explore what concepts of evidence are articulated by innovators as they review their contributions, and how these are linked back to the wider frameworks prevailing in health service provision.

Method

Design and Setting

A qualitative study, based on interviews, focused on a set of service innovations that had been officially recognized, in this case through the Health Service Journal (HSJ) Awards. The HSJ is the premier weekly journal read by NHS managers and professionals in the United Kingdom (http://www.hsjawards.co.uk). The broad aim of this research was to examine which factors were perceived to facilitate or obstruct the establishment and diffusion of service health care innovations (Barnett, Vasileiou, Djemil, Brooks, & Young, 2011). As part of this study, we identified a strongly articulated theme around evidence, recurrently employed to demonstrate the value of the innovations. The present article focuses on these evidential concepts.

Sampling Strategy and Recruitment

Groups that had won an HSJ award for service innovations constituted the target population of this study, providing us with two important opportunities. First, this sample was likely to give us access to the clearest and most concrete conceptualizations of evidence, since appeal to evidence was a criterion of the award. Second, the evidential concepts articulated by the innovators were likely to be highly valued within the NHS. This purposive sample cannot be representative of all health care innovators, but it has been selected in order to provide a strong probe on the concepts of evidence used by those most open to evidence and innovation. Therefore, we deem that we have isolated a critical community.

Acknowledging the high mobility of health care professionals and thus the possibility of not being able to contact a sufficient number of innovators, particularly from the earlier award years, initially, all 51 HSJ-winners organizations from 2007 to 2009 were approached and invited to participate. Of these, 24 expressed an interest in the study and 18 participants finally agreed to take part in interviews representing 15 innovations (response rate: 29.4%). Research suggests (Guest, Bunce, & Johnson, 2006) that data saturation is achieved with 12 interviews which produce the majority of themes when the sample is homogenous and the aim is to identify common experiences and perceptions. Of course, the definition of homogeneity of the sample is not a simple matter, but we considered that 15 interviews is acceptable in this exploratory study given that our sample was homogenous with respect to the main characteristic of interest—participants led the

development and evaluation of an award winning innovation—though we recognize variability on other important parameters pertaining for example to participants' exact job title or the nature of the innovation.

Of the organizations participating in our study, five were primary care organizations and 10 secondary[1]; three were HSJ winners of 2007, 2 of 2008, and 10 of 2010. Thirteen of the 23 award categories are represented in our sample (56.5%). Of the interviewees, 13 were females and 5 males; 9 participants were non-clinical managers, 3 physicians, 5 belonged to professions allied to medicine, and 1 was a nurse.

Interviews and Ethical Considerations

In depth, semi-structured telephone interviews were conducted with key organizational representatives, almost always the project leaders. Interviews took place during autumn 2010, lasting approximately 45 min. Initially, the organizational lead on each innovation was contacted and informed about the objectives of the study. Having indicated their interest, prospective interviewees were provided with an information sheet as well as a consent form, which was duly signed in each case. The interviews were recorded and fully transcribed. All interviews were conducted with one organizational representative, except for one case where four interviewees participated simultaneously, since they contributed to different aspects of the innovation.

The interviewees discussed the content of their innovation, the process of conceiving, developing, and implementing the initiative, and its potential diffusion (see Barnett et al., 2011). The issue of evidence was generally introduced by the participants but the interviewer prompted consideration of the indications of innovation success, when this was not the case. This study received ethical approval from the Research Ethics Committee of Brunel University.

Analytic Procedure

The transcribed interviews were subjected to thematic analysis (Boyatzis, 1998), an analytic technique suitable for identifying "repeated patterns of meaning" (Braun & Clarke, 2006, p. 86). The analysis started with a familiarization process through the repeated reading of the transcripts. Next, textual segments relating to evidence were coded, and themes and subthemes were developed. The resulting themes were revised and refined, until the researchers agreed on their validity and reflection of the data. Initial

content-based coding was applied by K.V., and themes and subthemes were developed and refined in unison with J.B. and T.Y. during regular discussions over the period of analysis.

Results

Four main concepts of evidence were identified: (a) evidence of effectiveness, (b) evidence of efficiency, (c) evidence of acceptance, and (d) evidence of relevance. Table 1 presents a brief definition of each evidential notion, its prevalence, and an illustrative example from the interviews.

Evidence of Effectiveness

This evidence demonstrated that the respondents believed that the innovation induced an impact. Two subcategories were identified: (a) the direct evidence and (b) the indirect evidence of effectiveness. The direct evidence of effectiveness evaluated the extent to which the effects that the innovation was designed to produce existed and were credible. Methods resembling field experiments were sometimes employed to generate this evidence taking measures under conditions of presence and absence of the intervention. In other instances, innovators piloted their service on a smaller scale before implementing it broadly, by collecting the indicators of the effect before and after the intervention (Table 1, 1A). Some interviewees expressed a desire for more data to document effectiveness, either in the form of a longitudinal study or in the form of an RCT. The latter was particularly valued by those innovators who were physicians. The variations believed to be induced were often represented statistically, through for example increases or decreases of numbers or percentages but sometimes there was a strong appetite for more rigor in statistical figures, particularly on the part of physicians.

Since most service innovations were not easily connected to improved health outcomes, indirect linkage was regarded as an important proof of effectiveness. Gathering evidence which would associate the impact of the innovation to beneficial health-related effects was declared to be a significant objective. Moreover, when sustainable funding for the continuation of the innovation was under threat, indirect evidence of prospective health benefits was perceived to be even more critical (Table 1, 1B).

Arguably, quantitative data prevailed in innovators' accounts, indicating that this was at the core of the notion of evidence of effectiveness. Nonetheless, there were two innovations where qualitative data were generated, primarily when patients' experiences were of interest. Even though these data

Table 1. Concepts of Evidence, Definitions, Prevalence, and Illustrative Extracts.

Concepts of Evidence	
1. Effectiveness	
Definition	This evidence demonstrated that the innovation had the effect believed or expected to have
Prevalence	Direct evidence: 16 instances across 8 interviews Indirect evidence: 8 instances across 4 interviews Total: 24 instances across 10 interviews
Extracts	1A: *. . . so we piloted it in the south of the city and offered it out as a service . . . and then we actually audited the results of their intervention. So we looked at things like anxiety and depression scores pre and post intervention, and actually evidenced that the team were having an effect on patients' wellbeing.* (Allied-to-medicine professional) 1B: *. . . so we're looking at getting some private finance to fund it going forwards really . . . So we were looking yesterday – you can show the likely health benefits of people who've never exercised who then do some exercise, and you can do some modeling on the basis then of what you might save in terms of diabetes and other things.* (Non-clinical manager)
2. Efficiency	
Definition	This evidence demonstrated financial savings and cost reductions
Prevalence	15 instances across 6 interviews
Extract	2A: *Our model enabled us to close the ward, which enabled us to give 500,000 back, which gave us the support to do what we wanted to.* (Allied-to-medicine professional)
3. Acceptance	
Definition	This evidence demonstrated that the innovation was utilized by the intended users
Prevalence	18 instances across 5 interviews
Extract	3A: *There are 101 primary care organizations across the UK and the Republic of Ireland now offer one or more of our programs, under that kind of scheme.* (Physician)
4. Relevance	
Definition	This evidence demonstrated the necessity of change and/or the scope for innovation
Prevalence	11 instances across 7 interviews
Extract	4A: *. . . we've got a great need in [name of city]. Each year, there's over 5,000 strokes and 30% of those are in people of less than kind of 55 years of age. So people think that it's an older people's condition, and predominantly it is, but it's not . . . not exclusively, and we've got one in four dies within 30 days, and you've got, one in two is dead or disabled at six months . . .* (Non-clinical manager)

constituted a significant part of the total corpus of evidence for these initiatives, they were perceived to be less powerful indications of effectiveness as the outcome of winning the award was attributed to the parallel availability of quantitative, "hard" evidence. This is in line with of a hierarchical view of evidence (Stewart, 2001).

Evidence of Efficiency

Financial data, predominantly in terms of savings and cost reductions, was powerful in reinforcing the significance and success of the innovation. Operating efficiently was a basic criterion of assessment, not only in relation to immediate financial savings but also in estimated future savings (Table 1, 2A). Innovators often based their argumentation on the anticipated cost-related benefits, while noting the difficulties in securing the funds that would allow these benefits to materialize.

Evidence of Acceptance/Uptake

The adoption and acceptability of the innovation by the intended users was an important indication of value across several innovations (Table 1, 3A). In some instances, innovators were not only interested in the number of people who used the service but also in their profile. Sensitivity to the characteristics of users was important when the service was offered universally, because, in this way, innovators could monitor whether the uptake of the innovation corresponded to their initial aims.

Evidence of Relevance

This concept was set against the backdrop of the pre-innovation evidence which indicated the need for change. In most cases, the evidence of relevance stemmed from a problematic situation which had to be addressed (Table 1, 4A). This evidence either originated from the health care organization itself or from external, national or international sources which were regarded to be trustworthy and credible. Statistical figures and numbers were once again the predominant illustration of this evidence. In some instances, the evidence of relevance was rooted in rigorous scientific research preceding the development of the innovation.

Discussion

It is evident that health care practitioners are highly attentive to the request for, and the value of, evidence when they are pursuing and evaluating novel activities. A rich classification of evidence was articulated reflective of both frameworks of evidential production, that is, clinical trials and improvement cycles. Despite the range of evidential concepts, most of this was pragmatically selected or produced, and was quite basic in its conception and articulation. Sometimes, it was admitted that there was a lack of technical knowledge for conducting more systematic evaluations and a few innovators were aware of the limitations of their approach, often expressing a desire for evidence of "higher" quality. Although clinical trials were seen by some as the best approach to evidence production, innovators' evaluative efforts were more aligned with the improvement cycle framework such that the previous situation was compared with the post-innovation situation.

Arguably the evidence of effectiveness was the most frequently articulated concept since it showed that the innovation "worked." Indeed, as many initiatives were not clinical interventions which would be translated into health outcomes, their association to health benefits was seen as important. Nonetheless innovators were also aware of the significance of other evidential functions valued within the NHS such as the request for efficiency, and they were also attentive to the responses of innovation users. Moreover, the evidence of relevance was considered to justify innovators' intentions to introduce prospective changes, suggesting that the decisions could not appear random, but they should be rooted in demonstrable necessity. Although pragmatically attained, this range of evidential notions indicates awareness or intuition of the plurality of questions requiring different answers, an idea which has been proposed in scientific literature and favors typologies of evidence that meet different research needs (Petticrew & Roberts, 2003).

Finally, there was a strong preference for quantification of the usefulness of the innovations and a parallel discounting of qualitative evidence in the few cases the latter was also gathered. This is indicative of a perceptual hierarchy of evidence (Stewart, 2001) where "hard" quantitative evidence is seen to provide the strongest proofs of innovation success.

Strengths and Limitations of the Present Study

This study provided unique insights into a critical range of concepts of evidence generated by health care professionals. The specificities of our

research context and sample selection enabled us to access the assumptions and sensibilities people hold around what constitutes worthy evidence within health care when evaluating new services. As a result, certain concepts of evidence, that we know from other studies (Beaulieu et al., 2008; Freeman & Sweeney, 2001; Higgins et al., 2011) that are routinely used and valued in decision making, such as evidence based on professional experience or personal beliefs (Beaulieu et al., 2008; Higgins et al., 2011), were not referred to in our study. Therefore, the present study did not account for the whole spectrum of evidential concepts health care practitioners are known to employ, but isolated a critical area of evidence, that is, the evidence mostly valued within an evaluative framework.

We acknowledge that this analysis can never completely escape the charge that these evidential concepts were a post hoc rationalization of what at the time had been a more ad hoc and serendipitous process. Also, this study is largely exploratory and does not allow firm conclusions to be drawn. To enhance the credibility of our findings and to substantiate their generalizability across health care innovators, triangulation is needed using alternative methodologies and a wider sample of health care practitioners who drive and assess service changes.

Conclusion

Four basic concepts of evidence were identified pertaining to innovation effectiveness, efficiency, acceptance, and relevance. Bringing these concepts together and recognizing the diversity, yet the constraints, that real-life contexts of health care practice are imposing on practitioners are essential elements if innovation is to be routinely attempted and achieved. The key challenge is to identify evidence that can be practically achieved on a large scale within the ongoing processes of care, while providing sufficiently robust findings to convince key stakeholders. To this end, the development of supporting mechanisms would be an important tool to assist professionals who pursue and assess service innovations.

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Note

1. Primary health care organizations provide community care and commission secondary care. The latter includes acute health care, and can be either elective care or emergency care. Elective care refers to planned specialist medical care or surgery, usually after referral from a primary or community health professional (http://www.nhs.uk/NHSEngland/thenhs/about/Pages/nhsstructure.aspx).

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